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**SEC - A**

# **Meltdown and Spectre**

Meltdown and Spectre exploit critical vulnerabilities in modern processors. These hardware vulnerabilities allow programs to steal data which is currently processed on the computer. While programs are typically not permitted to read data from other programs, a malicious program can exploit Meltdown and Spectre to get hold of secrets stored in the memory of other running programs. This might include your passwords stored in a password manager or browser, your personal photos, emails, instant messages and even business-critical documents.

**How to work**

Meltdown and Spectre work on personal computers, mobile devices, and in the cloud. Depending on the cloud provider's infrastructure, it might be possible to steal data from other customers.

Meltdown breaks the most fundamental isolation between user applications and the operating system. This attack allows a program to access the memory, and thus also the secrets, of other programs and the operating system.

Spectre breaks the isolation between different applications. It allows an attacker to trick error-free programs, which follow best practices, into leaking their secrets. In fact, the safety checks of said best practices actually increase the attack surface and may make applications more susceptible to Spectre

#### [Which providers are affected by Meltdown?](https://meltdownattack.com/#faq-cloud)

#### Cloud providers which use Intel CPUs and Xen PV as virtualization without having patches applied. Furthermore, cloud providers without real hardware virtualization, relying on containers that share one kernel, such as Docker, LXC, or OpenVZ are affected.

#### [Which systems are affected by Spectre?](https://meltdownattack.com/#faq-systems-spectre)

Almost every system is affected by Spectre: Desktops, Laptops, Cloud Servers, as well as Smartphones. More specifically, all modern processors capable of keeping many instructions in flight are potentially vulnerable. In particular, we have verified Spectre on Intel, AMD, and ARM processors.